Restricted

NAVY DEPARTMENT

BUMED NEWS LETTER

a digest of timely information

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Vol. 5 Friday, January 19, 1945 No. 2

TABLE OF CONTENTS

Form Letters:

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Current Malaria Research: The military importance of malaria in this war has led to the institution of a vast program of malaria research. Civilian investigators, aided by grants of funds from the Committee on Medical Research of the Office of Scientific Research and Development, and members of the Army, Navy and Public Health Service are all taking part in the program. In order to direct and coordinate these studies, there has been set up a Board for the Coordination of Malarial Studies. This Board is a joint enterprise

composed of civilian scientists and of representatives of the National Research Council, the Office of Scientific Research and Development, the Army, the Navy and the Public Health Service. Supervision by this body has resulted in cooperation and integration. Acting under the Board are four subcommittees - the Panel on Synthesis, the Panel on Biochemistry, the Panel on Pharmacology, and the Panel on Clinical Testing - which direct the research on malaria and on the development of new antimalarials.

The Panel on Biochemistry comprises a group of investigators who are studying the fundamental relationships between the parasite and the cells of the host which it infects. It is concerned also with the mechanism of action of antimalarials on the various developmental stages of the parasite.

The Panel on Synthesis supervises the work of chemist-contractors and cooperating pharmaceutical companies engaged in the synthesis of chemicals which are to be tested for antimalarial action. This work occupies the full time of over 300 specially trained organic chemists. When a drug is shown to have any degree of promise, the entire group to which it belongs is fully exploited, all chemically related compounds being tested in several avian species.

The Panel on Pharmacology supervises the testing of drugs for antimalarial action in animals. These drugs are first tested in chickens, ducks, canaries and turkeys artificially inoculated with their homologous strains of malaria parasites (Plasmodium gallinaceum, P. lophurae and P. cathemerium). Drugs which show promise in these lower animals are then tested, when practicable, in monkeys artificially infected with the strains to which these animals are susceptible (P. cynomolgi and P. knowlesi). Although drugs found to exert antimalarial activity in animals do not necessarily show the same degree of activity in humans, the vastness of the program necessitates this type of screening in lower animals. This Panel also directs studies of acute and chronic toxicity in animals.

The Panel on Clinical Testing receives the drugs which have shown promise against malaria in lower animals and monkeys and determines their effect in man. Preliminary toxicity studies are carried out in civilian volunteers, and the physiological disposition (absorption, distribution, degradation and excretion) is studied in detail. The drugs are then tested against standardized infection induced by the injection of infected blood or by the bites of infected mosquitoes. The antimalarial activity of each compound is correlated with the concentration of the drug in blood and tissues. Substances which prove to have a safe margin between the therapeutically effective and the toxic dose are given further trial in civilian installations, and if they prove particularly promising, they are then tested in relapsing vivax cases in the Army and Navy.

Progress: A number of compounds have been developed which possess a high degree of antimalarial activity against both vivax and falciparum malaria in man. Four of them have already undergone clinical trials in the Armed Services. Several compounds currently under study show promise of being superior to quinine and atabrine.

In addition to the studies on new antimalarials, several investigators are engaged in investigations of other aspects of malaria including immunity, vaccines, plasmodial tissue phases, etc.

Complement Fixation in malaria has been studied. In most instances, the antigen has been prepared from chicken blood heavily infected with Plasmodium gallinaceum. Positive tests have been obtained in 1 per cent of healthy humans, 4 per cent of individuals with fever (non-malarious) and 7 per cent of syphilitics. Among relapsing vivax cases 9,411 specimens of serum have been examined, of which 30 per cent were positive. A more detailed analysis shows that 33 per cent were positive five days preceding a relapse; 47 per cent were positive five days after a relapse; and 20 days after the attack 33 per cent were positive. A positive reaction almost always is present in experimental primary vivax malaria and persists for from 2 to 7 weeks following the attack. No correlation could be shown between the results of complement fixation tests and the number of previous attacks of malaria. Also the complement fixation reaction does not at present offer a means whereby relapses may be predicted. As yet it has no clinical or practical application.

Malaria Vaccines have been studied. A series of 26 servicemen with relapsing vivax malaria were given intravenous and subcutaneous injections of formalized vivax stromata, which were derived from highly parasitized human blood. Each injection contained from one to two and one-half billion parasites. In this series the relapse rate subsequent to vaccination in the vaccinated group was slightly less than it was in unvaccinated controls. In interpreting these results, it should be pointed out that it was difficult in this series to contrast the vaccinated cases with comparable unvaccinated controls. In another series of experiments in animals plasmodia and tubercle bacilli suspended in oil were employed. Simultaneously injected killed tubercle bacilli appear to enhance the antigenic response, and the oil assures a slow rate of absorption. Animals inoculated by this vaccine have been protected from dosages of sporozoites which would otherwise have proved fatal.

The Life Cycle of Malaria Parasites is being studied, and considerable progress has been made. After the mosquito injects sporozoites into men and prior to the invasion of the red cells by the parasites, it is apparent that there must be an "exo-erythrocytic phase" in which the parasites are harbored in the tissues. Similarly tissue reservoirs must exist during

the intervals between attacks in vivax malaria. However, such exo-erythrocytic forms have not been demonstrated in humans by histopathological methods even though biopsies have been made at the site of infected mosquito bites. Exo-erythrocytic forms, however, are demonstrable in the malaria of fowls. Sporozoites of P. gallinaceum ("chicken malaria") enter cells of the lymphoid-macrophage system within 30 minutes after inoculation into the skin of chickens. These cells serve as hosts for all stages of the first generation of parasites (cryptozoites). These cryptozoites develop from forms still recognizable as sporozoites into large schizonts and segmenters. Sporozoites are found in heterophil leukocytes as late as 6 hours following inoculation, but only a few of these show any appreciable development after 24 hours, and none is found to complete its development in this type of cell. Sporozoites are not found in the intercellular spaces after 6 hours. The first, or cryptozoic, generation requires about 42 hours (36 to 48) for development, whether the parasites grow locally at the site of inoculation or in the spleen. The second generation of parasites (metacryptozoites) is found in cells of the lymphoid-macrophage system and in endothelial cells. This generation undergoes segmentation at 70 to 84 hours. The first erythrocytic parasite is found 75 hours after intravenous inoculation of sporozoites. After 60 hours, numerous metacryptozoites are seen, especially in the site of inoculation following intracutaneous injection, and in the spleen, heart, kidney and brain following intravenous injection of sporozoites. Sparse erythrocytic parasites are seen at 90 hours, after which they gradually increase in numbers up to about 6 days. Then follows a precipitous increase in erythrocytic parasites.

The importance of these biological studies in the search for new and better antimalarials is great. Atabrine, quinine and recently developed antimalarials will rid the blood of erythrocytic forms and terminate a clinical attack. No drugs have yet been found which are effective against the tissue phase. Therefore, we have no truly curative drug and no causal prophylactic for vivax malaria. The demonstration of exo-erythrocytic forms in fowls is a fundamental discovery which will aid materially in the investigation of the activity of antimalarial drugs.

The In-Vitro Cultivation of Malaria Parasites has been undertaken with the hope that wider knowledge of the morphology, biochemistry and nutritional requirements of plasmodia might point the way to new methods of pharmacological attack. The medium into which the parasitized blood is placed consists of salt solution, water-soluble vitamins, purines, pyramidines, amino acids, sodium acetate, glycerol, glucose and proteose peptone. Oxygen, nitrogen and carbon dioxide are passed through the fluid. In cultivating P. knowlesi, a multiplication of 600 per cent was obtained within 22 hours. Using P. vivax a modified technic was required, as the parasites appeared to invade new host red cells with difficulty; also the

rate of multiplication of P. vivax was much slower than that of P. knowlesi. A method has thus been developed which will permit observation of the action in vitro of antimalarials on the metabolism and reproduction of the plasmodial cell.

The Acquisition of Natural Immunity as a result of undergoing repeated relapses has been the subject of several investigations. It is believed by some that repeated untreated relapses favor the development of immunity which eventually eradicates the disease. The presumption is that the erythrocytic phase stimulates immunity against the exo-erythrocytic phase. Opposed to this theory is the fact that many natives exhibit heavy parasitemia which may exist for long periods of time, an apparent equilibrium being established with regard to the host-parasite relationship. In natives with chronic parasitemia, however, the factor of repeated infection must be considered.

Available evidence favors the belief that tissue forms, which do not respond to antimalarials, undergo repeated cycles in which erythrocytic forms are discharged into the circulating blood. Cure in vivax malaria is believed to result from exhaustion of the reservoir of tissue forms, the duration of the disease not being increased or the course otherwise affected through prevention of relapses by suppressive therapy or by treatment of relapses with therapeutic doses of antimalarials. It is now established that suppressive therapy with atabrine over a period of 3 to 6 weeks will "cure" falciparum malaria. Is it possible that exhaustion of the supply of tissue forms occurs earlier in this type of malaria?

Although the issue has not been definitely settled, present information indicates that permitting relapses of vivax malaria to run their natural course does not significantly modify the number or frequency of subsequent relapses. Inasmuch as untreated relapses are debilitating to the individual, the practice of withholding therapy in military personnel would increase greatly the number of individuals rendered ineffective for military operations. (Prev. Med. Div., BuMed - F. T. Norris) (This manuscript was reviewed by Dr. Robert Loeb, Chairman of the Board for Coordination of Malarial Studies, who offered helpful suggestions).

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Bedbug Control with DDT: DDT has proved highly successful in the control of bedbug infestation. Extensive experimental spraying has helped to establish technics of application as well as proper timing with regard to retreatment of infested bunks.

Spraying with 5 per cent DDT in crude kerosene will destroy bedbugs within twenty-four to forty-eight hours. Also, bedbugs introduced into a

sprayed area within six months after its treatment will be killed. Two hundred and twenty c.c. of solution is the average amount required for one bunk. This includes the mattress, springs, bed frame and pillow. A compressed-air, paint-type spray outfit is the most satisfactory equipment for dispensing the solution, but any sprayer may be employed which will produce a semi-coarse spray and deliver not less than one pint in five minutes.

Before attempting mass spraying, one or two bunks should be sprayed first for practice and for determining the technic whereby proper dosage will be administered. Mattresses may then be placed in piles of eight or ten for convenience in spraying. Two men then turn over the mattresses and move them to another pile, while a third rapidly sprays all surfaces. Bed frames should be placed on end along the bulkhead during treatment in order that excess spray will fall on it. Further treatment of the bulkhead is not required. All clothing and rubber material (such as gas masks) should be protected from kerosene. Workers should wear masks of the filter type or of moistened fine gauze over the nose and mouth. Smoking should be prohibited in the room until the following morning. (Prev. Med. Div., BuMed - J. F. Shronts, F. T. Norris)

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Field Test of DDT as a Residual Spray against Mosquitoes: A native village in Panama has been thoroughly sprayed with a 5 per cent solution of DDT. Preliminary results indicate a marked reduction of mosquitoes in dwellings for 26 days. Mosquitoes were beginning to enter the sprayed houses at 29 days but few of those captured contained blood and 92.4 per cent of the captured mosquitoes died within 24 hours. (OEMcmr-29 Progress Report #10, Clark, Gorgas Memorial Institute; CMR Bulletin #20)

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Mobile Nutrition Unit: Late in 1943 the Naval Medical Research Institute developed a laboratory, built on a small truck, designed for field study of conditions of nutrition. The function of this unit is to bring specialists in the field of nutrition into direct contact with messing operations so as to assemble facts concerning the nutritive value, palatability and quality of food and to make them known in order that administrative officers can improve operations. Its work is strictly research. The studies encompass any factors which modify nutritive values, such as cookery, special equipment, methods of serving and galley design.

During the past year attention has been devoted exclusively to larger training stations in order to make contact with the greatest possible number of cooks, bakers and mess officers. Miniature laboratories were established in two mess halls for a period of two weeks.

The methods of survey have been steadily improved during the past year. Special technics of sampling have been evolved that are now finding use, even outside the Navy. During the past months inquiries have come from agencies concerned with evaluating industrial feeding and nutrition in homes for children and from the special committee concerned with nutritional research in homes for the aged.

A series of surveys in naval training centers indicates that the nutritive value of the food eaten by the typical enlisted man meets in every respect the levels established by the National Research Council. No study has been made of messes for officers.

The results of studies of typical galleys in two stations are summarized in the following data taken from Report No. 4, NMRI Project X-184:

NUTRIENTS SERVED PER MAN PER DAY

	USNTS Norfolk (Galley I)	USNTS Bainbridge	National Research Council Standards
Solids (Gm.)	666.0	707.0	- - -
Ash (Gm.)	34.0	31.0	- - -
Protein (Gm.)	117.0	131.0	70.0
Fat (Gm.)	166.0	120.0	- - -
Carbohydrates (Gm.)	349.0	422.0	- - -
Calories	3358.0	3292.0	3000.00
Calcium (Gm.)	1.3	1.7	0.8
Thiamin (mg.)	2.1	2.2	2.3
Riboflavin (mg.)	3.9	3.3	3.3
Niacin (mg.)	26.0	26.0	23.0
Ascorbic acid (mg.)	76.0		75.0

Data of this type that have accumulated indicate conclusively that the levels set by the National Research Council can be attained in practice by the Navy. This problem had been previously debated without available evidence.

The above data have not been corrected for edible wastes left on the plates or for food eaten at Ship's Service. By the application of such corrections it has become evident that men in active recruit training are eating only 3400 calories or less. Even at this level they are getting adequate amounts of essential nutrient factors. (C. M. McCay)

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Convulsions from Application of Penicillin to the Cerebrum: Commercial penicillin in saline, applied to the cerebral cortex of the cat, dog, monkey and man has given rise to convulsive manifestations. The antibiotic and convulsive factors of penicillin appear to be closely related, for they are affected about equally by ageing, boiling and acidifying the penicillin solution or by dissolving the penicillin in alcohol. They may be dissociated by autoclaving the dry powder, only the convulsive factor remaining. In man penicillin applied to the cerebral cortex in doses of 10,000 to 20,000 Oxford units may produce convulsive manifestations." (CMR Bulletin #20 - Walker and Johnson, Univ. of Chicago. To be published)

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Vascular Complications of Pentothal-Sodium Anesthesia: This form of anesthesia has established its field of usefulness in the last few years and is being used by an increasing number of anesthetists. There are certain complications which have been well recognized, but there is one that seems to be less well known than the others, and for this reason it is now called to the attention of all anesthetists and surgeons.

Some months ago there were reports in England of a serious complication following administration of the drug into the artery of the forearm instead of the vein. It would appear that in quite a number of individuals there is an aberrant artery on the volar aspect of the forearm just below the elbow, and it is not improbable that occasionally this may be mistaken for a vein. When injected with pentothal, this artery may go into spasm, thereby involving the whole arterial circulation of the forearm and sometimes resulting in gangrene of the forearm. This unfortunate accident happened sufficiently often to warrant the War Office's sending out a special circular to all surgeons and anesthetists in the Services warning them of this danger.

The following suggestions are therefore made: (1) Before inserting the needle a careful physical examination of the vessel should be made to obviate the possibility of injecting, insofar as possible, an aberrant artery. (2) When the first bit of solution is injected into the vessel there should be a temporary halt; and if the patient experiences any tingling or pain down the forearm, the needle should be withdrawn immediately. (On investigating the cases on record, it was found that they all experienced pain and tingling down the forearm as the solution was injected into the artery.) (3) It is suggested that perhaps superficial veins in another part of the body should be used more often for this type of anesthesia. (Quoted from Canadian Army Ltr. H.Q. 1980-1-86 of Dec. 6, '44.)

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Tourniquets in Surgery of the Hand: The danger associated with the prolonged use of tourniquets in war wounds has been wisely emphasized

recently. However, it should be pointed out that a bloodless field is essential for the careful dissection and meticulous technic required in surgery of the hand and forearm, and in this field its use should not be discouraged.

The type of tourniquet used has much to do with the danger associated with its use. The force exerted by a piece of heavy rubber tubing drawn tightly around the extremity is often far in excess of that required to compress blood vessels and in many cases is great enough to crush tissue and damage vessel walls.

A blood pressure cuff inflated to between 250 and 260 mm. Hg provides an even, measured pressure which is not harmful to the tissues. The cuff should be applied smoothly and not tightly, so that when the arm is elevated to empty the veins, blood is not trapped distal to the cuff. Before inflating the cuff, the arm should be elevated for 1 to 2 minutes to permit venous drainage. It is then inflated to between 250 and 260 mm. with the arm still elevated. The cuff can safely be kept inflated for two or even two and one-half hours without release. It has been used by the writer in many cases, and to his knowledge in several hundred by Dr. Sumner Koch. No damage has ever resulted. Obviously, the tourniquet cannot be used in cases with circulatory embarrassment. (W. H. Requarth)

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A paper entitled "Care of the Injured Hand", by Lt. Comdr. Requarth, appeared in the U. S. Naval Medical Bulletin of September 1943. An abstract of this paper was printed in the Bumed News Letter of October 29, 1943.

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Pathology of Primary Atypical Pneumonia: From the pathologic examination of many cases of primary atypical pneumonia Golden infers that the fundamental pulmonary lesion is an acute interstitial pneumonitis, essentially similar to influenzal pneumonitis uncomplicated by secondary bacterial invaders and to measles pneumonitis. His cases came, in the main, from Army hospitals, but there were also civilian cases both from this country and from abroad. The pathologic process centers about the bronchioles, which are filled with pus and desquamated cells from the lining, which is partially or completely destroyed. The bronchiolar walls are edematous and heavily infiltrated with round cells, in association with lymphocytic accumulation in the regional alveolar walls. In contrast to the findings in bacterial pneumonia, the alveolar spaces frequently contain air, although there is considerable variation of alveolar content. Others may contain edematous fluid and hyaline material as well as blood, but not frankly purulent exudate. Such lung sections do not as a rule reveal microorganisms on appropriate staining. In some

bronchiolar lumina the presence of a mixed bacterial flora suggests contamination from the upper respiratory passages. Secondary bacterial invasion may produce typical bronchopneumonia, lobar pneumonia, or even lung abscess, as in the last influenza pandemic. Grossly the lungs of "atypical pneumonia" resemble an acute miliary granulomatous process. The whitish "milia" in reality are bronchiolar swellings from which pus is easily expressed. The paucity of the physical signs and the spotty appearance of the X-ray are explained by the character of the pulmonary involvement. Unless X-ray views of the lungs are taken routinely and interpreted correctly, cases of atypical pneumonia may fail of recognition. (J.A.M.A. Editorial, Dec. 30, '44, discussing a paper of Golden which will be published in Archives of Pathology.)

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SCHISTOSOMIASIS: Human schistosomiasis is caused by any one of the three species of the genus Schistosoma which have man as their definitive host. The general details of the distribution and life history of the three blood flukes, Schistosoma haematobium (Bilharz), Schistosoma mansoni Sambon, and Schistosoma japonicum Katsurada, are given in the Table.

Life cycle: The essential intermediate hosts are snails. The eggs contained in human feces (in the case of S. mansoni and S. japonicum) and urine (in the case of S. haematobium) are deposited in water, where they hatch into ciliated miricidia (free swimming larvae). Upon coming in contact with an appropriate snail, they penetrate its liver, where in the course of a few weeks they undergo a twofold asexual process of multiplication with the production of two generations of sporocysts. The sporocysts metamorphose into fork-tailed cercariae which then leave the snail and infest the water. The cercariae, upon finding a suitable definitive mammalian host, penetrate the skin by the use of histolytic and mechanical organs of penetration. They enter the blood stream, pass through the veins and the lungs and eventually reach the portal system, where the adult flukes develop. In these veins the females, thread-like worms 15 to 20 mm. in length, are fertilized. They then migrate to the venous plexus of the bladder, colon or small intestine, the anatomical site of election varying according to the species involved. The cycle is maintained by the ova, which reach the bladder (in the case of S. haematobium) to be eliminated in the urine, or the intestinal tract (in the case of S. mansoni or S. japonicum) to be eliminated in the feces.

Epidemiology: Schistosomiasis caused by S. haematobium is closely associated with irrigation projects. In Egypt there are areas in which entire populations are infected. Religious practices in Mohammedan countries tend to increase both pollution of water systems and chances of infection. Man constitutes the only important source of haematobium infection for snails, although at least one species of monkey is known to become

infected under natural conditions. While the original endemic focus was apparently in the region of the Nile Delta, the disease has spread over much of Africa.

Schistosomiasis caused by S. mansoni also is closely associated with irrigated areas, although its intermediate hosts may require slightly different conditions. It has been carried from Africa, where it is highly endemic, especially in the Nile Delta and Central Africa, to the western hemisphere where it has become prevalent in Puerto Rico and in some parts of South America. In certain areas of Venezuela, over 90 per cent of the male population is infected. In the western hemisphere it is associated with the elevated limestone or dolomite coastal plains, because the snail which is its intermediate host requires alkaline water. The most important source of mansoni infection for snails is human cases although monkeys also can harbor the adult flukes.

Schistosomiasis caused by S. japonicum is intimately associated with rice culture in various areas in the Orient although only in China is it a public health problem and a hazard to the health of naval personnel. In China the area of its endemicity encompasses some 25,000 square miles in the Yangtze Valley and southward along the Pacific Coast. It has been estimated that a hundred million persons are potentially exposed to infection each year in China, that there are at present about eight million clinical cases and that schistosomiasis may be the cause of upwards of 100,000 deaths annually. The epidemiology is complicated by the fact that numerous animals, including the common domestic ones, may be definitive hosts. The species of snail which is the intermediate host of S. japonicum requires acidic water. Such water is found in the rice fields, where there is a high concentration of decaying organic material.

There are several other species of Schistosoma in addition to the three which are pathogenic for man. Some have birds or other mammals as their definitive hosts. Apparently cercariae of any species will attack any homiothermic animal which they encounter. If the animal so attacked is not the definitive host for the particular species, the cercariae will not develop after penetration of the skin. Schistosome dermatitis or "swimmer's itch" has been reported from Michigan, Wisconsin, Southern Canada, Japan, Malaya, Germany, France and Wales. It is caused by the penetration of the skin of man by cercariae pathogenic for other animals, and therefore it is not followed by the development of schistosomiasis. (See Bumed News Letter of Oct. 29, '43.)

Prevention and control: Schistosomiasis is best prevented by avoiding water containing the cercariae. Bathing and swimming in endemic areas should not be allowed until water is known to be free from cercariae, and waterproof clothing should be provided for those who must carry out military or other operations in infested waters.

Etiologic Worm & Disease	Geographic Distribution	Cycle in Man
Schistosoma haematobium which causes urinary schistosomiasis	Nile Valley, Sudan Ethiopia, East Coast from Italian Somaliland to Cape of Good Hope, Belgian Congo, West Africa, Lake Chad, and Nigeria to Angola, North Africa from Morocco to Egypt, Greece, Portugal, Cyprus, Palestine, Syria, Arabia, Madagascar, Mauritius, Reunion.	Cercariae penetrate skin, enter blood stream and work way into portal system. Female worms lay eggs in venous plexuses around bladder and rectum; many of the eggs remain in adjacent tissues. Some eggs may be carried to liver and other organs, and many are discharged in urine but few are found in feces.
Schistosoma mansoni which causes intestinal schistosomiasis.	Nile Delta, Upper Sudan, East African Coast from Zanzibar to Zamberi River and inland through north Rhodesia and Tanganyika to Belgian Congo, Natal, Transvaal, Madagascar, Senegal, French Guinea, Congo Basin, Sierra Leone; Yemen, Arabia; Brazil, Venezuela, Lesser Antilles, Puerto Rico, Santo Domingo.	After penetrating the skin, the cercariae work their way via the blood stream to portal system. Female worms lay eggs in venous plexuses around colon and rectum. Some eggs remain in adjacent tissues; some are carried to liver and many are discharged in feces, rarely in urine.
Schistosoma japonicum which causes biliary schistosomiasis or schistosomiasis japonicum.	Japan, China, Formosa, Celebes; Leyte, Mindoro and Mindanao in the Philippines.	Passing through the skin, the cercariae go by way of the blood stream to the portal system. Eggs are laid by the female in mesenteric veins around the intestine. Some of these eggs are carried via the portal system to the liver and other organs; some remain in the adjacent tissues, and others are discharged in the feces.

Reservoirs	Intermediate Hosts	Ecology of Intermediate Hosts
Man is only reservoir of importance.	Certain species of the genera Bulinus and Physopsis.	Nonoperculate aquatic species; sewage feeders; occur commonly in irrigation canals.
Man is only reservoir of importance although naturally infected monkeys have been found.	Certain species of African and Mediterranean planorbid snails; species of Australorbis in America.	Old world intermediate hosts are nonoperculate aquatic species occurring in irrigation projects, ponds, etc. New world intermediate hosts are nonoperculate aquatic species occurring primarily in alkaline water in small pools, lakes, etc., in limestone or dolomite areas.
Man, dogs, cats, rats, mice, field mice, cattle, water buffalo and horses.	Certain species of the genera Katayama, Oncomelania, and Schistosomaphora.	All are amphibious and operculate. They occur primarily in ditches, lake shores, sluggish streams, rice fields, with decaying organic material and acid water.

Cercariae can be killed by boiling or by heavy chlorination (chlorine residual of 3 p.p.m. for 30 minutes). Since the cercariae can survive only a short time, impounding of water under snail-free conditions should render it free of infective cercariae in 48 hours. Sand filtration and ammonium-sulphate treatment are apparently ineffective.

An ideal approach to schistosomiasis prevention, when practicable, is snail control. In the case of the snails which act as the intermediate hosts of S. haematobium and S. mansoni periodic drying of irrigation canals, irrigated fields, and other habitats is successful to a certain degree, although some snails escape by burrowing into the mud. The use of copper sulphate or copper carbonate in dilutions of from 1 to 50,000 to 1 to 100,000 helps to reduce the intermediate host population of these species. These measures are ineffective against the amphibious operculate (lidded) snails which act as intermediate host of S. japonicum. In Japan much of the endemic area has been cleared through eliminating the snails by use of limestone. These snails require a relatively high hydrogen ion concentration. The use of limestone renders their habitat alkaline and therefore unfavorable. This control measure is practicable, however, only on a limited scale.

In the case of S. haematobium and S. mansoni the situation may be improved by proper disposition of urine and feces, since infected human cases are the reservoirs of the disease. This method of control is not as applicable to S. japonicum, because not only man but many other mammals, including the common domestic ones, are reservoirs. Mass chemotherapeusis has not yet proved effective as a preventive measure because of constant reinfection.

Infection does not confer immunity against subsequent reinfection.

Pathology: The pathological changes produced by all three types of schistosomes are essentially the same. Penetration of the skin by cercariae may produce mild irritation and petechiae. The adult worms are not believed in themselves to produce pathologic lesions. The ova of S. japonicum, S. haematobium and S. mansoni, while differing in morphology, all possesses the ability, because of their chitinous bodies and rough contours, to excite an inflammatory and proliferative reaction. The basic lesion of schistosomiasis is the small abscess which develops around the ovum wherever it lodges in the body. A round-cell infiltration of the site of lodgment of the ovum takes place. The numerous minute abscesses are believed to be responsible for the diarrhea, fever, leucocytosis and eosinophilia occurring during the first stage of the disease. Ova are usually deposited in the small blood vessels of the mucosa of the bowel or rectum and rupture into the lumen or reach it by tiny tracts. As a result an ulcer or a small pseudotubercle is produced. The inflammatory response results in the development of granulation tissue and fibrosis. In the intestine and rectum polyps may be

formed. Massive inflammatory reactions may occur when a sufficient number of ulcers are in proximity or coalesce. Ova are swept into the portal circulation from areas of deposition in the intestinal mucosa and become lodged in the spleen and liver, there producing pathological changes which, if extensive and not halted, may lead eventually to cirrhosis of the liver and massive splenomegaly simulating Banti's syndrome. The bladder, rectum, intestines, liver and spleen are the principal sites of involvement, but the ova are occasionally carried in the circulation to almost any part of the body, and pathological changes have been noted in the brain, lungs, kidneys, ureters, prostate, urethra, heart and striated muscles. Probably owing to the elasticity of lung tissue, fibrosis of the lung is not particularly common.

Clinical picture: Basically the type of clinical picture which develops following schistosomal infection varies with the site of deposition of ova.

The disease may be divided into three stages: The early stage is characterized by diarrhea, urticaria, pulmonary symptoms and fever. During the second stage widespread dissemination of ova takes place as well as extrusion of ova into the bladder (haematobium) or intestinal tract (japonicum and mansoni) with resultant hematuria or dysentery. The third or end stage is characterized by tissue destruction, proliferation and fibrosis. It is important to remember, however, that the disease may be symptomless for months or even for from two to three years.

The penetration of the skin by cercariae may occasionally be signalled by intense pruritis and small petechiae about the sites of entrance or by dermatitis. Several days or weeks later urticaria, headache, eosinophilia, fever, malaise, diarrhea and pulmonary manifestations such as cough or crepitations usually appear.

In S. japonicum and S. mansoni infections the second stage frequently begins with a dysentery. The passage of bloody mucus continues as ova are extruded from the intestinal and rectal wall. The process is usually accompanied by abdominal pain and tenderness, fever, enlargement of the spleen and liver, anorexia, loss of weight, leucocytosis and eosinophilia. During this period ova are also being carried to the liver and spleen, and it is believed that some of the symptoms arise as a result of involvement of the liver. The acute febrile reaction of the second stage generally lasts from three to ten weeks. The second stage of S. haematobium infections differs from that of the other two in that adults of this schistome are located principally in the bladder mucosa, producing inflammation of the bladder wall and hematuria. The wall of the lower colon also may be invaded by S. haematobium.

The third stage, which is characterized by permanent tissue changes, differs in the various types of schistosomiasis because of variations in

the localization of adult schistomes and in the degree of severity of the infection. S. japonicum is more virulent than the other species, has a greater output of eggs, and tends to localize in greater proximity to the superior mesenteric veins. Therefore, schistosomiasis caused by this species is characterized by greater damage to the viscera. During the third stage tissue proliferation gradually develops. The bowel wall becomes thickened and abscesses and papillomata appear. With the thickening of the intestinal mucosa more and more ova are carried into the portal circulation producing progressive damage to the liver and spleen. Certain small portal vessels may be closed by emboli. The liver parenchyma is gradually replaced by fibrous tissue with the production finally of a small cirrhotic organ. The spleen, however, continues to enlarge owing, it is thought, to circulatory congestion. Ascites and edema of the lower extremities develop if cirrhosis is extensive. Severe cases develop secondary anemia and have recurrent bouts of dysenteric symptoms. Death may result from exhaustion, or from a complicating disease. In severe infections three to five or more years usually elapse between the time of infection and the terminal stage.

The S. mansoni type of infection differs from the S. japonicum type in several particulars during the third stage. The spleen of S. mansoni schistosomiasis is so massive and firm that the term "Egyptian Splenomegaly" has been applied to it. The liver is cirrhotic but remains enlarged rather than shrunken as it is in the more severe S. japonicum infections. The condition resembles Banti's syndrome. Ascites may develop in such cases accompanied by low-grade fever, wasting and anemia. Polypoid growths in the large intestine and in the neighborhood of the sphincter ani often develop in late cases. Pulmonary complications are common and are thought to be a frequent cause of death.

In S. haematobium infections hematuria (endemic hematuria) may persist for years. Cystitis, bladder calculi, papillomata of the bladder and a tendency toward carcinoma of the bladder are common late developments. In addition the condition may extend to the rectum, prostate and urethral passages with resultant strictures, fistulae and external granulations. Hydronephrosis and renal colic may result from involvement of the kidneys and ureters.

Diagnosis: Specific diagnosis in all three types of schistosomiasis is made by finding the ova in the stool in the case of S. mansoni or S. japonicum infections, or in the urine in S. haematobium infections. The ova may be seen with a low-power objective.

Ova of S. japonicum are oval and transparent but show a rudimentary spine or knob laterally near one end. They are approximately 70 to 90 μ long. Ova of S. mansoni are considerably larger and have a well developed

lateral spine. Ova of S. haematobium have a characteristic terminal spine and also are larger than the ova of S. japonicum. While they are commonly found in the urine, they may in certain cases be found in the feces. Various concentration technics may be required when ova are few in number.

Fairley has developed a complement fixation test using an antigen made from livers from infected snails which is considered of value in diagnosis. The disease should always be suspected in endemic areas in the presence of eosinophilia, dysentery or hematuria.

S. japonicum infections must be differentiated in the early stage from typhoid, miliary tuberculosis and other chronic febrile diseases. During the second or dysenteric stage, they must be differentiated from amebiasis or bacillary dysentery. In the third or advanced stage they may simulate Banti's disease, kala-azar, chronic malaria, or non-schistosomal cirrhosis. S. mansoni infections must, in addition, be differentiated from carcinoma of the lower colon or rectum, if extensive granulations and fibrosis develop in that area.

The principal conditions requiring differentiation from S. haematobium disease are acute and chronic cystitis, malignancies of the bladder and genito-urinary tract, gonorrhea, tuberculosis, hemoglobinuria and renal calculus. Cystoscopic examination may be of particular differential value. It is important to remember that S. haematobium and S. mansoni frequently infect the same individual in areas where the disease is endemic in Africa.

Prognosis: The prognosis in all forms of schistosomiasis varies with the severity of infection and the period of the disease at which therapy is instituted. Mild infection may give little trouble. When the infection is allowed to progress to the third stage, the prognosis is generally poor. With the development of marked cirrhosis, splenomegaly and ascites, therapy is ineffective, and the condition is usually hopeless. Likewise, the presence of marked ulceration of the intestine and extensive papillomatosis of the rectum or bladder are unfavorable from a prognostic standpoint. In severe late cases of S. haematobium infection, death is frequently due to secondary carcinoma of the bladder or to renal disease. Early diagnosis and prompt and adequate therapy are, therefore, of utmost importance in the successful management of this disease.

Treatment: Trivalent antimony compounds are specific in the treatment of all types of schistosomiasis. It is important to stress the fact that the efficacy of treatment declines progressively with the duration of infection. Advanced cases with marked irreversible intestinal, hepatic or genito-urinary damage will benefit little from specific therapy. The failure of cases with cirrhosis to tolerate antimony well renders treatment with this

drug of limited value in late stages. Surgery may have to be resorted to in selected late cases.

Some difference of opinion exists as to the antimony preparation of choice for treatment. Tartar emetic has been employed for many years with success. The high degree of toxicity of this drug, its occasional unpleasant side effects - particularly epigastric distress, nausea, vomiting, the circulatory and respiratory depression - as well as its cumulative action have made it undesirable in the opinion of many clinicians. Its use is usually contraindicated in cases of advanced cardiac, pulmonary and hepatic disease.

A drug which has to a considerable extent replaced tartar emetic is fuadin (neoantimosan), another trivalent antimony compound. Toxic symptoms are rare with this drug although nausea and joint pains may occur, and deaths have been reported following its administration.

Emetine and anthiomaline also have been used in the treatment of schistosomiasis. These drugs, while considered very effective, have been given limited use because of their toxicity.

Good supportive care should be provided. Patients should be given a high caloric and high protein diet, and iron is indicated if anemia develops. Mild cases may remain ambulant.

Removal of the spleen may be beneficial in advanced S. mansoni and S. japonicum cases which resemble Banti's disease. Paracentesis of the abdomen for removal of ascitic fluid may be required in cases with advanced cirrhosis.

Surgical removal of bladder calculi and papillomata may be desirable, and surgical relief of urethral strictures and perineal fistulae developing in S. haematobium cases is often required. Removal of rectal papillomata and polyps affords great relief in certain cases.

Tartar emetic (sodium antimony tartrate) may be administered as follows:

Inject intravenously 2.5 c.c. of a 2 per cent solution of tartar emetic in distilled water the first day. Increase this dose each day by 1.25 c.c. until a dose of 7.5 c.c. is reached, and continue administration until a total of 12 to 15 doses have been given. Injections should be given slowly with care to avoid injecting the drug into the tissues outside the vein. Patients should lie down for one hour following each injection. The effect of the drug may be measured by the diminution in the number of ova found in the

stools or urine or their disappearance. An additional course of treatment should not be administered until after an interval of at least two or three weeks.

Fuadin may be administered as follows:

Inject intramuscularly 1.5 c.c. of a 6.3 per cent solution of fuadin the first day. This should be followed by 3.5 c.c. and 5.0 c.c. on successive days, and then 5.0 c.c. every other day to a total of 10 doses. After the conclusion of a treatment the feces or urine should be examined for ova. If symptoms persist and viable ova still appear, the course of treatment may be repeated after an interval of two weeks. A third course of treatment may sometimes be necessary.

Current research: Several investigators working under the direction of the Committee on Medical Research of the Office of Scientific Research and Development are now conducting research regarding the treatment of schistosomiasis. It is hoped that knowledge acquired through such investigations will lead to improvements in our methods of therapy in this disease.

Infections with S. mansoni and S. haematobium have now been established in laboratory animals, including monkeys, hamsters, mice, rats and rabbits. The natural cycle is maintained by using as intermediate hosts snails which have been imported from countries where schistosomiasis is endemic. The possibility of employing some species of domestic snails as experimental intermediate hosts is being explored.

The effectiveness of new drugs, including pentavalent antimony compounds, against these experimental infections in animals is being determined. Also, reappraisal is being made of the schedules of dosage recommended for tartar emetic and fuadin. These studies have been greatly aided by the development of new quantitative methods for determining levels of antimony in the blood and tissues.

Studies are being carried out at the Naval Medical Research Institute in an effort to find chemicals which when applied to the skin or, by impregnation, to the clothing will prevent penetration of the skin by the cercariae.

Among the chemical compounds being tested are currently available insect repellents and insecticides. (Prev. Med. Div., BuMed - D. S. Farner, & Prof. Div., BuMed - F. A. Butler)

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Variation of Action of Sulfathiazole on Escherichia Coli and Streptococcus Faecalis with Changes in the pH of Urine: The influence of the hydrogen ion concentration on the bacteriostatic action of sulfathiazole against certain bacteria in urine has recently been studied by Sung and Helmholz.

Sulfathiazole in concentration of 60.4 mg. per 100 c.c. was much more effective against Streptococcus faecalis at pH 5.5 than it was at pH 7.2. In contrast, against Escherichia coli, sulfathiazole at a concentration of 50 mg. per 100 c.c. was much more effective at pH 7.2 than at pH 5.5. (Proc. Staff Meet. Mayo Clin., Dec. 13, '44)

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The clinical application of this interesting observation is limited. The effectiveness of sulfonamides in urinary tract infections depends more on tissue than on urine concentration. Raising the hydrogen ion concentration of the urine would not affect the pH of the tissues. Furthermore, complications due to the formation of crystals would be frequent in the presence of an acid urine.

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Hyaluronidase, A Common Factor in Infection and Fertilization: The steady advances of biochemistry and immunology have been disclosing the presence of the same complex compounds, some of them being known as possessing remarkable physiological effects, in apparently unrelated living entities. Omitting vitamins and the common enzymes, the cases of some sex hormones, cardiac glucosides and the Forssman antigen may be suggested as representative examples.

Recently another interesting example involving a system of a powerful enzyme and its specific substrate has been added to the list. Hyaluronidase, best known and most important of the "spreading factors", is present abundantly in invasive bacteria such as staphylococci, pneumococci and some anaerobic gas-gangrene bacilli, in the poisonous secretions of snakes and insects, in leeches and in the testes and sperms of mammals. By hydrolizing the hyaluronic acid present in the cement between the cells of the connective tissues, the gelatinous fundamental substance of the mesenchyme, the enzyme brings about a spreading throughout the tissues of any particulate matter inoculated along with it and hence of the bacteria themselves that secrete the enzyme.

It has been known for several years that the arrival of spermatozoa in the area surrounding the mammalian tubal ova is followed by a disaggregation

of the cumulus cells and corona radiata surrounding the ovum, this phenomenon being a preliminary step practically indispensable for fertilization. It has been known also that the cumulus cells are embedded in a transparent viscous material, as Long showed in 1912. Manipulation of these cells reveals the sticky nature of the intercellular cement. The freeing of ova from the protective cells is accomplished by extracts of sperm not only from homologous but also from heterologous species.

In 1942 two independent teams of workers, McClean and Rowlands in England and Fekete and Duran-Reynals in this country, discovered in rats and mice respectively that the addition to ova kept in vitro of a variety of materials known to be rich in hyaluronidase resulted in the prompt disaggregation of the cumulus oophorus cells. Highly purified preparations of testicular hyaluronidase, if used in high concentrations, free the ovum from surrounding cells in sixty seconds.

Recently Rowlands has found that in female rabbits previously treated with chorionic gonadotropin and inseminated with titrated suspensions of homologous spermatozoa to which hyaluronidase has been added the amount of spermatozoa needed to ensure fertilization is one-sixth less than in controls inseminated without addition of the enzyme. These experiments throw light on the number of sperm required to be inseminated in order that one or a few spermatozoa may reach the ova in the fallopian tube. Also, it suggests an explanation for infertility associated with oligospermia.

For many years embryologists have been eagerly looking for chemical components in sperm capable of bringing about individually a few, at least, of the marvelous effects that the intact spermatozoon does after entering the ovum. All these efforts have failed. Although not concerned with fertilization in the strict sense of the term, the hyaluronidase effect can be considered as a step in this direction. Other interesting contributions in this regard are those of Tyler on the specific interacting substances of eggs and sperm in lower marine animals and the unexpected analogies between these effects and the antigen-antibody reactions of orthodox immunology.

That the cement between the cumulus cells, like the fundamental substance of the connective tissue, has hyaluronic acid as its main or only component may not be surprising. However, the same enzyme in the poison of rattlesnake venom or the secretion of Clostridium welchii is responsible for the brutal effects of these materials. In other words, the same enzyme substrate system is of basic importance in two biologic processes as different from each other as infection and reproduction. (J.A.M.A. Editorial, Dec. 30, '44)

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Mode of Action of Chlorinating Agents: Chlorinating agents suppress bacterial growth by paralyzing the enzyme systems concerned in the oxidation of glucose. Of the 20 or more enzymes involved in this process, the most sensitive to the action of chlorinating agents is triosephosphoric dehydrogenase.

"It is instructive to compare the relative efficiencies of various chlorinating agents in inhibiting glucose oxidation in vivo on the one hand and the oxidation of triosephosphoric acid in an isolated system on the other. When dealing with the intact cell, hypochlorous acid is less ineffective than chlorinating agents in which chlorine, being bound to an organic molecule, is only partially dissociable. However, when dealing with the isolated enzyme, all the chlorinating agents tested appear to have approximately the same activity per unit of active chlorine regardless of the mode of attachment of chlorine. The action of a chlorinating agent on a bacterial cell may be resolved into two phases: (1) penetration of the cell and (2) reaction with the susceptible enzyme system. In other words, before a chlorinating agent can react with an enzyme system, it must be able to penetrate the cell and reach that system without being dissipated in side reactions on the way. Slightly dissociating chlorinating agents like succinchlorimide and halazone run much less risk of side reactions than hypochlorous acid and are therefore more effective than hypochlorous acid at the same level of chlorine concentration. But this advantage does not apply to an isolated enzyme system in which there is no problem of penetrating a membrane. The advantage of one chlorinating agent over another appears to be purely a matter of the degree of conservation of active chlorine during the process of penetrating the cell." (OEMcmr-443 Progress Report #3, Green, Columbia Univ. - CMR Bulletin #20)

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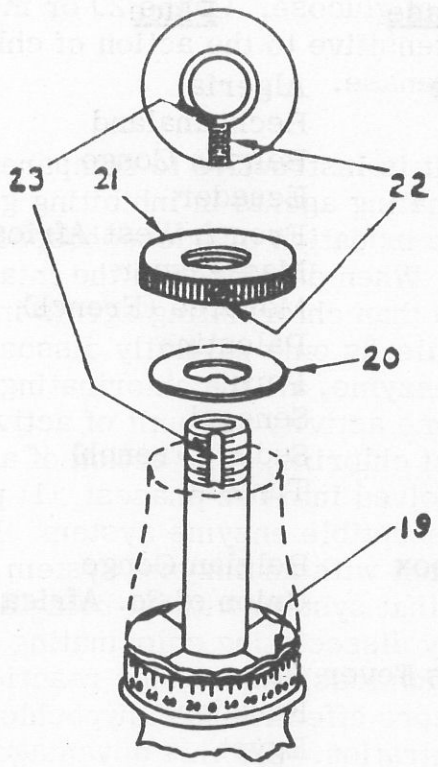
Cylinders for Oxygen and Other Gases Used in Therapy or Anesthesia; Urgent Necessity for Their Return: Such cylinders are entirely out of stock at the Naval Medical Supply Depot, Oakland, and but a limited supply is currently available at NMSD, Brooklyn. West Coast contractors for medicinal gases have advised NMSD, Oakland, that 34,000 gas cylinders have been delivered to the field and that reports indicate that many "empties" are being discarded or diverted to other uses at overseas activities.

In view of this critical situation, it is mandatory that empty cylinders for medicinal gases over and above local needs be returned immediately to the nearest Medical Supply Depot for further disposition. (Materiel Div., BuMed - K. C. Melhorn)

Improper Installation of C.D.X. Dental X-Ray Tubeheads: Serious and costly damage has resulted from the improper installation of C.D.X. dental X-ray tubeheads (General Electric X-ray Corporation). When installing a new unit or replacing a defective tubehead, the following procedure should be followed in detail:



Place the metal spring washer (19) over the stud projecting from the fork, insert the stud on the fork through the hole in the bracket, place the keying washer (20), and screw on the round nut (21). Tighten this nut just enough to allow the fork to swivel, and then lock the set screw (22) in this nut. BE SURE TO PUT THE NUT IN POSITION SO THAT THE SET SCREW ENGAGES THE SLOT (23) IN THE STUD. The position of this stud must be determined before placing the head, because this slot is not always located in the position shown in view. (Materiel Div., BuMed - K. C. Melhorn)

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Antivenins, South and North American Anti-Snake Bite Sera (Stock Nos. S1-810 and S1-812) of No Value in the Far East: Recently a dispatch request for Antivenins, South and North American Anti-Snake Bite Sera was received by the Naval Medical Supply Depot, Brooklyn, from an area in the Far East. Before placing a procurement order for these sera, expert opinion as to their value in treating snake bites in that area was sought from Dr. William Mann, Director, National Zoological Society, Washington, D. C.

According to Doctor Mann the snakes in the Far East are the Brown and King Cobras and Vipers, against the venom of which the above-mentioned antivenins are of no value. Accordingly, efforts are being made by BuMed to locate a source of supply of antivenins suitable for use in the Far East. (Materiel Div., BuMed, K. C. Melhorn)

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Public Health Foreign Reports:

Disease	Place	Date	Number of Cases
Plague	Algeria	Oct. 11-20, '44	16
	Bechuanaland	Oct.-Nov. '44	171 (90 fatal)
	Belgian Congo	Oct. 1-14, '44	6 (4 fatal)
	Ecuador	Oct. '44	4 (1 fatal)
	French West Africa	Oct. 21-Nov. 10, '44	53 (31 fatal)
	Madagascar	Oct. 1-20, '44	7
	Morocco (French)	Oct. 11-20, '44	18
	Palestine	Oct. 21-Nov. 11, '44	19
	Peru	Oct. '44	5 (4 fatal)
	Senegal	Oct. 28-Nov. 10, '44	20 (12 fatal)
	Sudan (French)	Oct. 21-28, '44	2 (fatal)
	Tunisia	Oct. 11-31, '44	9
Smallpox	Belgian Congo	Oct. 1-28, '44	894 (3 fatal)
	Union of So. Africa	Aug. '44	346 (38 fatal)
Typhus Fever	Chile	Sept. 10-Oct. 7, '44	51 (5 fatal)
	Ecuador	Oct. '44	108 (14 fatal)
	Egypt	Oct. 7-14, '44	36 (2 fatal)
	Gibraltar	Oct. 14-21, '44	1
	Guatemala	Oct. '44	109 (15 fatal)
	Irish Free State	Oct. 28-Nov. 4, '44	1
	Morocco (French)	Oct. 11-20, '44	28
	Peru	Sept. '44	90
	Tunisia	Oct. 11-31, '44	65
	Turkey	Oct. 28-Nov. 11, '44	50
	Yugoslavia	Sept. 1-14, '44	538
Yellow Fever	Colombia	Aug.-Sept., '44	4 (3 fatal)
	Ivory Coast	Nov. 24, '44	1 (suspected, fatal)

(Pub. Health Foreign Reps., Dec. 8, 15 & 22, '44)

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ALNAV 214

Subj: File and Service Numbers on Form Fa Card 30 Nov 1944

Effective immediately enter in the right-hand side of the block of line 1 on Form Fa Card (Individual Statistical Report of Patient) the file (serial) number of officers or the service number of enlisted personnel Navy and Marine Corps. Also the file (serial) or service number of officer and enlisted personnel shall be written on the outside of the cover of the health record.

--SecNav. James Forrestal.

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To: All Ships and Stations Concerned With Aircraft. BUMED-Q-BHL P2-1/A21

Subj: Quarantine with Reference to Aircraft and Passengers. 30 Nov 1944

Ref: (a) BuMed ltr P2-1/A21(024) of 9 Aug 1944; N.D. Bul. of 31 Aug 1944, 44-991.

1. Appendix I C of reference has been found to be unsatisfactory in that the formula given for calculating the size of the fuselage does not apply to all planes and frequently results in too much insecticide being used. In order to avoid confusion and insure the proper amount of insecticide being used, the table below will be followed and used as a guide for other planes of similar size:

Type of Plane	Seconds of Spraying
One seated	3
R50 series	10
R4D series	15
PBY series	15
RY-3, PB4Y-2	20
PBM series	25
R5C-1	25
R5D-1	40
PB2Y-3R	45
XPB2M-1R	90

--BuMed. W. J. C. Agnew.

Approved:
Aubrey W. Fitch
Deputy Chief of Naval Operations (Air)

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CIRCULAR LETTER NO. 367-44

To: All Ships and Stations. PERS-319-MLJ
P16-4(A)

Subj: Travel Orders for Patients and Attendants. 11 Dec 1944

Refs: (a) BuPers Circ Ltr 85-43; N.D. Bul. Cum. Ed. 1943, 43-1108, p. 744.
(b) BuPers-BuSandA joint Ltr of 29 Apr 1944; AS&SL Jan-Jun 1944, 44-512, p. 756.
(c) BuPers Circ Ltr 296-44; N. D. Bul. of 30 Sep 1944, 44-1144.

1. In order to expedite the issuance of travel orders in connection with the transfer of patients, including the necessary attendants, where prior approval has been obtained from the Bureau of Medicine and Surgery, references (a), (b) and (c) are hereby modified to the extent that above-mentioned orders may be issued by the medical officer in command of a naval hospital, and reimbursement for travel involved may be made by disbursing officers without further approval by BuPers.

2. This authority includes air travel when considered necessary.

3. In the cases of officers a copy of orders will be forwarded to BuPers. Copy of page 9 of service record will be forwarded to BuPers in the cases of enlisted men. --BuPers. L. E. Denfeld.

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To: All Ships and Stations. BUMED-D-HM
A3-3/P5

Subj: Report of Dental Operations and Treatment, NavMed K (1942) - Revision of, Effective in Reporting Operations and Treatments Beginning Calendar Year 1945. 12 Dec 1944

Refs: (a) Man. Med. Dept., pars. 2316 and 3420.
(b) Man. Med. Dept., pars. 232 and 240(g).
(c) BuMed ltr of 17 Jun 1943, P5-2(102), par. 4; N.D. Bul. Cum. Ed. 1943, 43-1171, p. 478.

1. Subject form, revised, is effective for the reporting of dental operations and treatments beginning with the calendar year 1945. Twenty copies are furnished, without requisition, to all reporting dental activities; additional supplies are to be requisitioned from the naval medical supply depots in the usual manner. The prior issue shall be scrapped upon receipt of Forms NavMed K (Rev. 1/45). A reproduction of the new form and additional instructions for its use are given below.

2. Revision was necessary in order to present statistical information of greater value to the Bureau of Medicine and Surgery. It is important that the form be accurately completed so that compilation and evaluation of the various entries will yield figures presenting a correct index of accomplishment in the rendition of treatment by the Dental Corps. It must be clearly understood that the figures are not to be interpreted by the Bureau in terms of quantitative output, but rather as an indication of the nature, quality, and scope of dental service rendered. Determination of the adequacy of dental facilities for the treatment of personnel at specific naval activities is an important consideration.

3. Section on form headed "Case Statistics":

Entries made under this section apply only to new cases. Care must be exercised to avoid duplication of entries when cases run over from one month to another. For instance, a case of cellulitis occurring in January with treatment continuing into February will be entered on the January report in the column headed "This Month"; no entry being made in the "This Month" column of the February report.

The "Year to Date" column will give a running account of the new cases of each type that occur during the calendar year.

4. Definition of terms used under the section of the form headed "Treatment Summary":

(a) "Essential Treatment Completed" indicates the correction of all gross dental defects so that additional dental treatment will not be expected for a period of six or more months.

(b) "Completed Treatment" is to be considered treatment of such nature that the patient will have had all dental defects corrected to the extent permissible by current instructions and directives (references (b) and (c)).

5. Entries under the section of the form headed "Remarks":

The reporting dental officer will make comment hereunder in regard to conditions or circumstances which have affected the rendition of dental service for the month covered by the report. Examples: (a) One dental officer - 5 days' leave. (b) Dental office being renovated - 10 days. (c) Dental treatment rendered to destroyer crew - 30 men treated. (d) Dental officer on sick list - 10 days. Other remarks which the dental officer deems relevant or pertinent may be included. --BuMed. Ross T. McIntire.

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NAVMED-K
(Rev.1/45)

REPORT OF DENTAL OPERATIONS AND TREATMENT

(See instructions on reverse side)

FROM _____ MONTH ENDING _____

	NUMBER THIS MONTH	NUMBER CAL. YEAR TO DATE
OPERATIVE DENTISTRY		
RESTORATIONS:		
AMALGAM, (one surface)		
AMALGAM, (two surfaces)		
AMALGAM, (over two surfaces)		
SILICATE		
TOTAL RESTORATIONS		
BASE, INTERMEDIATE		
BRIDGE, CROWN, INLAY; RECEMENTATION OF		
CROWN, PORCELAIN, POST (Davis)		
FACING, REPLACEMENT OF		
FILLING, ROOT CANAL (teeth)		
PROPHYLAXIS		
PULP, CAPPING OF		
PULP, REMOVAL OF		
ORAL SURGERY		
ABSCESS, INCISION AND DRAINAGE OF:		
EXTRA-ORAL		
INTRA-ORAL		
ALVEOLECTOMY		
ANESTHESIA, ADMINISTRATION OF:		
GENERAL		
REGIONAL		
CELLULITIS, INCISION AND DRAINAGE		
CYSTECTOMY		
FOREIGN BODY, SURGICAL REMOVAL OF		
FRACTURE, MAXILLO-FACIAL, FIXATION OF		
GINGIVAL FLAP, EXCISION OF		
GINGIVECTOMY		
MANDIBLE, FRACTURED, FIXATION OF		
MAXILLA, FRACTURED, FIXATION OF		
ROOT, RESIDUAL, SURGICAL REMOVAL OF		
SEQUESTRECTOMY		
TOOTH, IMPACTED, REMOVAL OF		
TOOTH, IN ANTRUM, REMOVAL OF		
TOOTH, UNERUPTED, REMOVAL OF		
TOOTH, SURGICAL, REMOVAL OF		
TOOTH, UNCOMPLICATED, REMOVAL OF		
TUMOR, EXCISION OF		
TOTAL EXTRACTIONS		
OTHER		
RADIODONTIA		
ROENTGENOGRAMS:		
EXTRA-ORAL		
INTRA-ORAL		
OTHER		

	NUMBER THIS MONTH	NUMBER CAL. YEAR TO DATE
PROSTHODONTIA AND LABORATORY PROCEDURES		
BRIDGE		
CROWNS (not bridge abutments)		
ACRYLIC		
GOLD		
PORCELAIN, CAST BASE		
PORCELAIN JACKET		
TOTAL CROWNS		
DENTURES, ARTIFICIAL:		
FULL		
PARTIAL		
TOTAL DENTURES		
INLAYS (not bridge abutments)		
ACRYLIC		
GOLD		
PORCELAIN		
TOTAL INLAYS		
SPLINT, FRACTURE		
OTHER		
DENTURE, REBASE OR REPAIR OF		
DENTURE, RECONSTRUCTION OF		
MISCELLANEOUS TREATMENTS		
ABSCESS, DENTOALVEOLAR		
CELLULITIS		
FRACTURE, BONE		
GINGIVITIS		
GINGIVITIS, VINCENT'S		
LEUKOPLAKIA		
ODONTOCLASIA		
ODONTORRHAGIA		
OSTEOMYELITIS		
PERICORONITIS		
PERIODONTITIS		
PERIODONTOCLASIA		
POSTOPERATIVE		
PULPITIS		
ROOT CANAL		
SEDATIVE		
STOMATITIS		
TRAUMATIC OCCLUSION		
TRISMUS		
OTHER		

	NUMBER	
	THIS MONTH	CAL. YEAR TO DATE
CASE STATISTICS		
ABSCESS, DENTOALVEOLAR		
CELLULITIS		
FRACTURE, MANDIBULAR		
FRACTURE, MAXILLARY		
FRACTURE, MAXILLO-FACIAL		
GINGIVITIS		
GINGIVITIS, VINCENT'S		
LEUKOPLAKIA		
ODONTORRHAGIA		
OSTEOMYELITIS		
PERICORONITIS		
PERIODONTITIS		
PERIODONTOCLASIA		
RESTORATIONS POLISHED AND FINISHED		
STOMATITIS		
TRAUMATIC OCCLUSION		
TRISMUS		
OTHER CASES		
EXAMINATIONS		
ORAL DIAGNOSIS		
RECORDS, PREPARATION OF		
NAVMED H-4		
NAVMED AV-1		
NAVMED L		
NAVMED Y (Annual)		
NAVMED Y (Other than annual)		
TOTAL RECORDS		
SPECIAL (Consultation)		
PROSTHETIC CASES SUMMARY		
PATIENTS WHOSE TREATMENT WAS COMPLETED		
PATIENTS AWAITING TREATMENT AT END OF MONTH		X X X

	NUMBER	
	THIS MONTH	CAL. YEAR TO DATE
TREATMENT SUMMARY		
TOTAL SITTINGS (visits)		
NUMBER OF PATIENTS:		
(a) REQUIRING TREATMENT (of those examined)		X X X
(b) RECEIVING TREATMENT		X X X
(c) ESSENTIAL TREATMENT COMPLETED		
(d) ALL TREATMENT COMPLETED		
PERSONNEL STATISTICS		
DENTAL OFFICERS		X X X
DENTAL TECHNICIANS GENERAL		X X X
DENTAL TECHNICIANS PROSTHETIC		X X X
OTHER ENLISTED ASSISTANTS		X X X
SHIP OR STATION PERSONNEL STATISTICS *(Omit figures if confidential)*		
AVERAGE COMPLEMENT		X X X
AVERAGE TURNOVER		X X X
ADDITIONAL NUMBER DEPENDENT UPON THIS ACTIVITY FOR TREATMENT		X X X

REMARKS

D.C., U.S.N.
(Dental Officer)

1st Endorsement

TO: Commanding Officer

1. Forwarded

M.C., U.S.N.
(Medical Officer)

2nd Endorsement

TO: Bureau of Medicine and Surgery

1. Forwarded

U.S.N.
(Commanding Officer)

Instructions

1. This report, in duplicate, shall be submitted as soon as practicable after the last of the month via official channels to BUMED.
2. A separate report, in duplicate, shall be submitted as in (1) for treatment of Veterans' Administration Patients. Such reports shall be marked "VAP" directly above the signature of the dental officer.
3. A supplementary report, attached to this form, shall be submitted for authorized treatment of personnel of the armed services of Allied Nations. See current directives.

REPORT OF DENTAL OPERATIONS AND TREATMENT (BACK) NAVMED K (Rev. 1/45)

To: All Ships and Stations. BUMED-T
P3-1/P3-2
Subj: Venereal Disease Contact Report. 9 Dec 1944

Refs: (a) Ltr BuMed-Y-RBG, P3-1/P3-2(023) of 14 May 1944; AS&SL Jan-Jun 1944, 44-555, p. 387.
(b) Ltr BuMed-T, L8-2(072) of 14 Jun 1944; AS&SL Jan-Jun 1944, 44-684, p. 416.

1. Effective immediately, paragraph 6 of reference (a) is canceled and superseded by the below:

(a) Replacement supplies of the subject item shall be requisitioned, from naval medical supply depots and storehouses in conformity with paragraph 3 of reference (b), as follows:

Stock No.	NavMed	Item	Unit
S16-2015	171	Venereal Disease Contact Report	25 sets in pad

--BuMed. Ross T. McIntire.

* * * * * *

To: All Ships and Stations. BUMED-TWS-PIL
L7-1/EN10(042)
Subj: Petrolatum, Liquid, Stock No. 1-575, Removal of from Contents of Boat Box, Stock No. 2-185, and from All Life Rafts, Life Floats, and Floater Nets. 18 Dec 1944

Refs: (a) Alnav 194-44; N.D. Bul. of 15 Oct 1944, 44-1167.
(b) BuMed ltr L7-1/EN10(042), Y-ec (Form Ltr No. 42) of 9 Apr 1942; N.D. Bul. Cum. Ed. 1943, 42-2097, p. 426.

1. Evidence accruing subsequent to the issue of references (a) and (b) indicates that liquid petrolatum (mineral oil) is not effective in the prevention of "immersion foot" in those who are forced to abandon ship. Therefore, reference (b) is hereby canceled and reference (a) is modified to the extent that the words "2 units stock number 1-575 and" are deleted.

2. Steps shall be taken to remove liquid petrolatum from all boat boxes, life rafts, life floats and floater nets. Liquid petrolatum thus removed shall be taken into stock by the medical department of the activity concerned.

--BuMed. Ross T. McIntire.

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To: All Ships and Stations. S33-6-(7)(848)

Subj: Life Preservers, Kapok, Jacket Type - Leg Straps for. 22 Dec 1944

Ref: (a) BuShips Bulletin of Information No. 16, of 1 Oct 1944, pp. 78-85, inclusive.

1. As a result of service reports, this Bureau has revised the design of kapok life preservers, jacket type, Stock No. 23-P-160, to provide leg straps, as illustrated in reference (a). Current production is in accordance with this design.

2. Forces afloat should modify all jacket type kapok life preservers now in service by attaching these leg straps. Two leg straps are required for each life preserver. One leg strap consists of:

One piece of 1-inch webbing approximately 5 inches long to which are attached two "D" rings.
One piece of 1-inch webbing approximately 46 inches long.

3. To provide for the above modification of life preservers now in service, leg straps are being procured and stocked as rapidly as possible at all major naval supply activities in the continental United States and overseas. It is expected that sufficient quantities of these leg straps will be delivered by 1 March 1945 to accomplish modification of all jacket type kapok life preservers now in service. If the overseas supply activities do not receive original stocks of these items by 1 March 1945, or if they require more stock than is initially provided, they should submit requests to the Supply Officer, Navy Yard, Philadelphia, direct.

4. Supply activities should issue the subject material to fill "not in excess" requisitions submitted by forces afloat. Two leg straps should be issued with each kapok jacket type life preserver (not equipped with leg straps) which may be issued after receipt of the above stocks. Since this material is being issued for the alteration of authorized equipment, no change of ship allowances will be required.

5. Figures 1, 2, and 3, herewith, give dimensions of the leg straps and instructions for their attachment. They should be placed at the cross stitching under the armholes as indicated in the illustrations. --BuShips. W. F. Christmas.

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LT. ELINOR D. RICH W-VS USNR.

BUREAU OF MEDICINE AND SURGERY,
NAVY DEPARTMENT,
WASHINGTON, D.C.

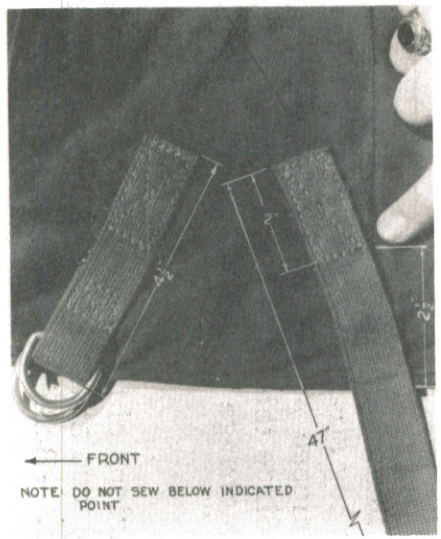

Fig. 1

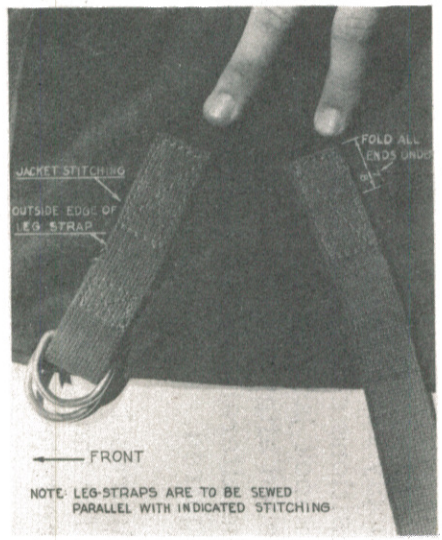

Fig. 2

Fig. 3